

# Vermont Biodiesel Supply Chain Survey

Prepared for the



**Vermont Sustainable Jobs Fund**

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## Executive Summary

Nationally, biodiesel is a commercially viable, renewable, low carbon diesel replacement fuel that is widely accepted in the marketplace. As evidence of this, the Vermont biodiesel industry has grown significantly over recent years – with total gallons of pure biodiesel and biodiesel blends sold in Vermont going from 275,000 gallons in 2005 to an estimated 5,632,000 gallons in 2008. However, despite all of its benefits as a renewable, low-emission fuel with strong potential local economic development potential, biodiesel remains an underutilized resource with low market penetration. Vermont biodiesel consumption peaked in 2008 at 5,632,000 gallons and fell in 2009 to 1,885,500 gallons. This represents about 1% of the state's total distillate fuel consumption in 2008 of 193 million gallons. In addition (but not unrelated), the number of fuel dealers carrying biodiesel fell from 18 in 2008 to eight currently.

There is no escaping the fact that biodiesel remains a “boutique” fuel in Vermont – the consumption of which is falling despite years of effort to develop and sustain the market. The questions are: Why? And what, if anything, can be done about it?

This study attempts to look at some of the reasons why the market is not developing as hoped from the perspective of four key sector groups – commercial end-users, residential end-users, fuel dealers, and biodiesel producers. According to the biodiesel consumers in this study, the primary challenges to increased adoption are:

- Fuel availability
- Convenience of use and delivery
- Price of biodiesel
- Technical issues

However, the fact that fuel availability, technical issues, and convenience of use were cited by users as challenges suggests that this is not just a “demand-side” problem. For their part, fuel dealers that have formerly carried biodiesel cited four main reasons for no longer doing so:

- Infrastructure issues
- Supply issues
- Low customer demand
- Expiration of the federal biodiesel tax incentive in 2009

Infrastructure issues such as storage, pumping, and blending facilities may be addressed through strategic capital investments – if fuel dealers are convinced that customer demand will provide a return on their investment. “Supply issues” may be solved by terminals and blending facilities in closer proximity to the fuel dealers themselves. The federal blender's tax incentive has been retroactively extended through 2011 but the fact that biodiesel at all but the lowest blends comes at a price premium is a particular challenge for consumers during this protracted global recession. Perhaps most importantly, the fact that biodiesel users cite “fuel availability” as an issue while fuel dealers are concerned about “low customer

demand” suggests a chicken-and-egg challenge that would require a more complete market assessment and analysis to find the best solutions.

## **1. Introduction**

### ***I. Survey Background***

The Vermont biodiesel industry has grown significantly over the last 10 years. However, during the last two years, industry growth has slowed. There are likely a number of reasons for this slowdown, not the least of which is the global economic recession that has impacted many sectors. However, there may be additional factors that have contributed to slower sales and reduced production, including technical issues, public perception, infrastructure challenges, policy barriers, etc. In order to stimulate industry growth, the Vermont Sustainable Jobs Fund has undertaken this study in an effort to more completely understanding the dynamics of the industry, its primary players, and the underlying reasons for reduced sales during the last 24 months. Specific goals of the survey are to:

1. Inform spending priorities for funding aimed at stimulating the Vermont biodiesel industry
2. Inform policy priorities aimed at stimulating the Vermont biodiesel industry

The survey targets four key industry groups that play a critical role in the Vermont biodiesel market:

- Fuel dealers
- Commercial biodiesel end-users
- Residential biodiesel end-users
- Biodiesel producers

By hearing directly from the groups that are “on the ground” using, making, and distributing biodiesel, we hope to provide a clear assessment of the state the industry.

### ***II. Current and Historical Vermont Biodiesel Consumption***

According to the 2009 *Report to the Legislature on Biodiesel Production and Use in Vermont*<sup>1</sup>, at the end of 2008 there were approximately 18 fuel dealers selling biodiesel in Vermont. The total gallons of pure biodiesel and biodiesel blends sold in Vermont went from 275,000 gallons in 2005 to an estimated 5,632,000 gallons in

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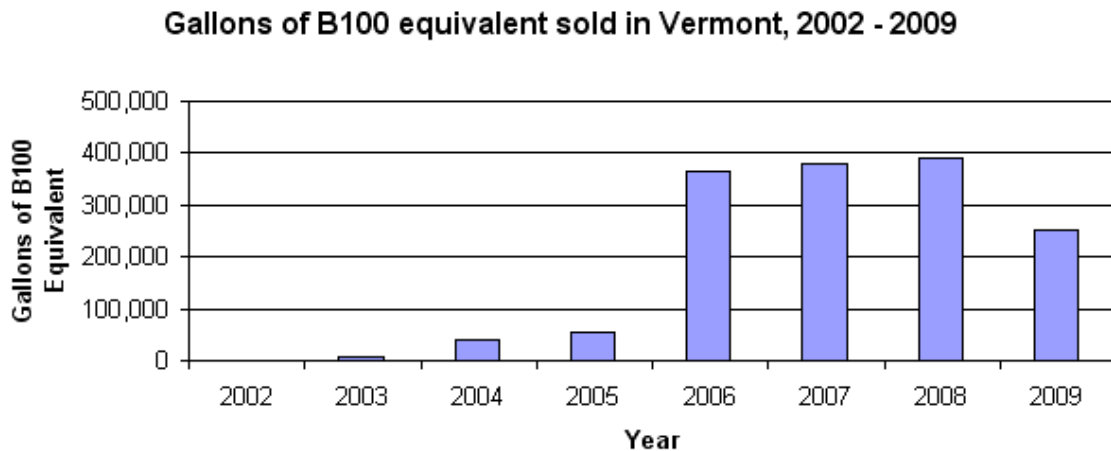
<sup>1</sup> Source: Vermont Department Public Service report, 2009:  
[http://publicservice.vermont.gov/energy/ee\\_files/Vermont%20Biodiesel%20Report%202009.pdf](http://publicservice.vermont.gov/energy/ee_files/Vermont%20Biodiesel%20Report%202009.pdf)

2008 – an increase of more than 2,000%. Of this amount, about 78 percent was consumed as heating fuel and about 22 percent was used in transportation.<sup>2</sup>

For instance, during the period from 2005-2008 the amount of petroleum distillate that was replaced with B100<sup>e</sup> jumped from about 78,000 to 480,000 gallons. Another way of analyzing the impact of Vermont’s biodiesel consumption is that in 2008, 1,417 barrels of crude oil were replaced with renewable low-emission fuel, thus Vermont’s biodiesel customers avoided emitting over 3,800 tons of CO<sub>2</sub> (if they had instead been using only fossil fuels).

This study surveyed 35 Vermont fuel dealers in Vermont, eight of which indicated that they had sold biodiesel (either as heating fuel or as transportation or both) in 2009 in blends ranging from B5 to B99.9. This is not an exhaustive list of fuel dealers; other dealers likely exist in the state, but they were unresponsive to our phone calls. Of the dealers that sold biodiesel in 2009, the total gallons of pure biodiesel and biodiesel blends sold in Vermont was an estimated 1,885,500 gallons in 2009 – a decrease of 66% from 2008 sales volumes. The amount of petroleum distillate that was replaced with B100<sup>e</sup> fell from 480,000 gallons in 2008 to 252,275 gallons in 2009. Seven fuel dealers indicated that they formerly sold biodiesel but no longer sell it due to a variety of reasons. Three dealers stopped selling it in 2006, two in 2007 and two in 2010.

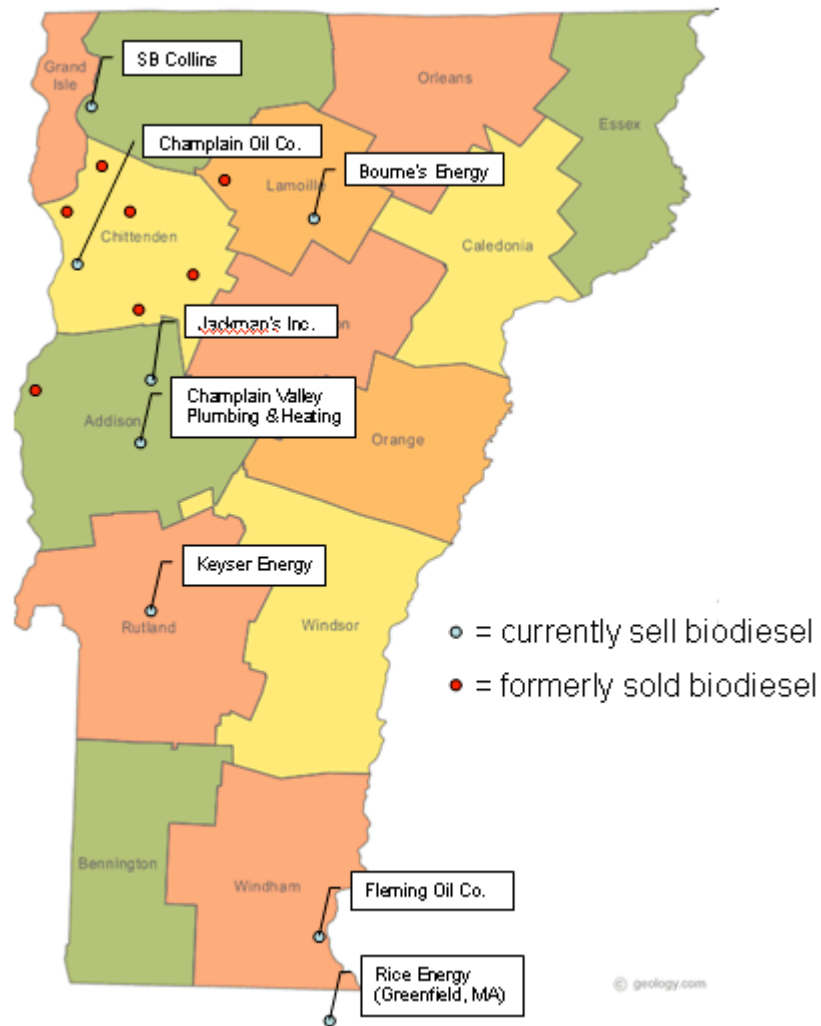
Figure 1 below illustrates estimated Vermont biodiesel (B100<sup>e</sup>) consumed from 2002 through 2009. 2009 figures are estimated based on selected responses from fuel dealers during this study.



<sup>2</sup> In this study, the pure biodiesel portion contained within a given volume of blended biodiesel shall be expressed in B100 “equivalents” by using a B100<sup>e</sup> notation. For instance, if a reference is made to the consumption of 1000 gallons of B20 (20 percent biodiesel and 80 percent petrodiesel), this study would express that data as “200 gallons of B100<sup>e</sup>”

Figure 1 shows a slow growth in sales from 2002 – 2005 and then a sharp increase from 2005 to 2006, followed by a relative plateau and peak in 2008. Sales volumes fell in 2009 to 252,275 gallons of B100<sup>e</sup>.

Figure 2 below illustrates fuel dealers that are currently selling biodiesel, as well as those that indicated that they are no longer selling biodiesel but have at some time in the past.



**Figure 2 Current and past commercial sellers of biodiesel**

## **2. Market Sector Findings**

### ***III. Commercial Biodiesel End-Users***

#### **Methodology**

Eighteen commercial biodiesel end-users were interviewed in person or on the phone between November 2010 and January 2011. Users included commercial fleet owners and operators, Vermont state buildings operators, town garages, colleges and universities, and manufacturers. Commercial end-user survey questions are provided in Appendix A. While these questions provided a guideline for the interviews, conversations often ranged to biodiesel-related topics beyond the scope of the survey itself. Both quantitative and qualitative results of the interviews are summarized below.

#### **Findings & Analysis**

##### **Current Users**

The majority of past and present commercial end-users began using biodiesel between 2005 and 2006, with some beginning use as recently as 2009. Eleven commercial users (61% of the 18 commercial users surveyed) indicated that they are currently using biodiesel for on-road transportation fuel or heating fuel, though none used biodiesel for both applications. The nine users of biodiesel as transportation fuel consumed an estimated total of 66,789 gallons of B100<sup>e</sup> in 2009. One commercial user of biodiesel for heating fuel used 200 gallons of B100<sup>e</sup> in 2009 and the other used 25,800 of B100 in 2010.

Biodiesel suppliers to the commercial end-user included SB Collins, Bourne's Energy, Champlain Valley Plumbing and Heating, Champlain Oil Company, Evans Fuel, Mirabito Energy Products, Burke Oil (based in Massachusetts). One commercial user fuels its fleet primarily at gas stations. Two commercial users indicated that they request fuel bids on a regular basis and suppliers therefore vary.

Seven current commercial users (39%) indicated they pay a premium for biodiesel. Premium amounts ranged from pennies per gallon for B5 to \$0.10 per gallon for B20 when the federal biodiesel tax credit was in force, to as much as \$0.38 per gallon for B20 during 2010 when the tax credit had expired (The \$1.00 per gallon of B100 was reinstated in December 2010). Other users indicated that they are paying "current market price" for biodiesel, that they "pay a little more for B5 but don't track the price," and "the biodiesel price is competitive with straight diesel on average."

Nearly all biodiesel (past and present) users cited the environmental benefits of biodiesel as a motivating factor for using it. Other factors included local purchasing, marketing value, setting a good example, and biodiesel as "the right thing to do." In



municipal settings there were often one or more biodiesel champions at the government or operations level that advanced biodiesel usage.

### **Former Biodiesel Users**

Seven of the eighteen (39%) commercial end-users surveyed indicated that they had used biodiesel in the past but were not doing so currently. Reasons given for no longer using biodiesel included:

- Biodiesel price premium
- Technical difficulties
- Erratic Availability
- Inconvenient supply

Two of the seven former biodiesel-for-transportation users indicated several system plugging and fuel filter plugging problems when using blends B10 to B20 in their fleet vehicles. One biodiesel-for-transportation user has been unable to source biodiesel for its fleet from a local supplier during the past 12 months despite frequent efforts. During this study, the fuel dealer indicated that it is upgrading its infrastructure and will return to providing commercial and retail biodiesel in the spring of 2011. One former user of biodiesel for heat discussed biodiesel supply difficulties – especially as it related monitoring and maintaining the fuel levels in several smaller fuel tanks and the lack of “automatic delivery” of biodiesel. This could be considered an issue of delivery convenience as much as a “supply problem.” Three of seven cited the price premium of biodiesel as the reason they stopped using biodiesel.

Former users cited several circumstances that would have them reconsider using biodiesel again:

- Price of biodiesel on par (or cheaper) than straight diesel
- Assurance that technical issues could be addressed
- Assurance of reliable supply, including “automatic” delivery
- Improved on-site fuel storage and pumping infrastructure around the state.

In general, there was a “once-burned, twice-shy” attitude among former users, which suggested that some additional technical assistance might be required to persuade former users to try biodiesel again. Three former users also expressed some questions about the environmental value of biodiesel especially as it relates to emissions and the food-for-fuel question. Two former and two current users wondered whether the latest engine technologies that reduce emissions might eliminate the need for biodiesel.

### **Wish Lists**

Past and present commercial users were asked about their biodiesel-related “wish lists”. Some responses:

- Warranty approval for higher biodiesel blends.
- Supply location of fuel more convenient to fleet.
- 24-hour fuel availability for fleet fueling.
- Price break in the form of tax credit, subsidies, etc.
- Price parity with straight diesel.
- Public education regarding biodiesel benefits (e.g., environmental, economic)
- Online listing of all commercial biodiesel pumps.
- Biodiesel “hotline” to answer any questions.
- A locally produced “Made in Vermont” fuel.
- Smaller biodiesel delivery trucks to deliver heating fuel to smaller facilities.

#### ***IV. Residential Biodiesel End-Users***

##### **Methodology**

In December 2010, an electronic survey was sent via email to over 1,100 individuals on an email list maintained by Renewable Energy Vermont (REV) to ask for their opinions about biodiesel. The survey invitation email specifically sought responses from individual/residential biodiesel end-users. Residential end-user survey questions are provided in Appendix B. Five days later a reminder email was sent. Two days later the survey was closed to new respondents and results were compiled and analyzed.

##### **Findings & Analysis**

There were a total of 121 survey respondents, though not all respondents completed the survey. Nearly one-third of respondents reside in Chittenden County (33.1%). The next highest response rates came from the following counties: Washington (16.1%), Windham (12.7%), Addison (8.5%), Lamoille (6.8%). Out-of-state residents made up 3.4% of the respondents, and the remaining 19.4% were residents of other Vermont counties.

Thirty-five survey respondents (28.9%) were using biodiesel at the time of the survey. This “current users” category includes 24 people who use biodiesel only for transportation fuel, seven who use it only for heating fuel and four who use it for both transportation and heating fuel. Of the 86 respondents who do not currently use biodiesel, 19 have used it previously (“past users”). Of the people who have never used biodiesel, 72.3% indicated that they are considering using biodiesel in the future (“potential users”).

A small percentage of past and present biodiesel users make their own biodiesel rather than purchase it. Those who do purchase biodiesel are buying from a range of locations. Survey respondents mentioned nineteen unique fuel dealers by name as purchase locations, including some in MA and NH.

Survey takers were asked to indicate the total volume of biodiesel (transportation and heating separately) purchased in the past three years that they’ve used it. A

total of 42 quantitative responses were analyzed and are presented in the table below.

<b>Table 1: Total volume of biodiesel purchased in the past three years (gallons)</b>									
		<b>B5</b>	<b>B10</b>	<b>B20</b>	<b>B99</b>	<b>B100</b>	<b>SVO</b>	<b>Range / Unspecified Blends</b>	<b>Totals</b>
<b>Current Users</b>	<b>Trans.</b>	1,405	560	4,050		3,739	1,200	4,975	15,929
	<b>Heat</b>				300		3,200	1,200	4,700
	<b>3 Year Total</b>	1,405	560	4,050	300	3,739	4,400	6,175	20,629
<b>Past Users</b>	<b>Trans.</b>	40		1,550		120	100	1,600	3,410
	<b>Heat</b>	1,400		1,950		100		1,300	4,750
	<b>3 Year Total</b>	1,440	0	3,500	0	220	100	2,900	8,160

While it is difficult to extrapolate these responses to Vermont’s residential biodiesel sector as a whole, respondents currently using biodiesel accounted for over 20,000 gallons of biodiesel over the past three years. Past users accounted for another 8,000 gallons of biodiesel over the most recent three years they were using it.

The majority of current biodiesel users began using it within the past five years. Peak years for beginning to use biodiesel were between 2004-2006.

To understand user experiences, survey participants were asked to explain their positive and negative experiences using it. Below, the most commonly mentioned motivators and concerns are listed, followed by some exemplary comments.

**Motivators**

1. Environmental, lower emissions (>90%)
2. Better performance/fuel efficiency
3. Local energy source
4. Price was right
5. Health
6. Cleaner burn
7. Better lubrication
8. Recycling/WVO
9. Transform market
10. Political statement

**Concerns**

1. Supply reliability
2. Price was too high
3. Technical issues
4. Lack of knowledge
5. Food or fuel issues

Comments from users listing motivating factors:

- “reduced emissions”,
- “lower environmental footprint”,
- “avoiding fossil fuels”,
- “cleaner running”,
- “helping out local companies versus oil companies” and
- “reduced reliance on foreign oil producers and an alternative revenue source for Vermonters”

Comments of concern from past users or non-users:

- “Will it void warranties? Who can answer my questions? Conventional fuel dealers will not.”
- “Do I have the right equipment to use biodiesel? Could my home heating system run on biodiesel or would I have to change the system? I don't have enough knowledge about this topic.”
- “Need to find sources that are NOT annual crops. Either perennial crops or delve much deeper into the algae sources.”

## ***V. Fuel Dealers***

### **Methodology**

Eighteen past or present biodiesel fuel dealers were interviewed on the phone or in person between December 2010 and February 2011. Fuel Dealer survey questions are provided in Appendix C. While these questions provided a guideline for the interviews, conversations often ranged to biodiesel-related topics beyond the scope of the survey itself. Both quantitative and qualitative results of the interviews are summarized below.

### **Findings & Analysis**

#### **Current Biodiesel Dealers**

We obtained responses from eight fuel dealers who currently sell biodiesel, either for transportation or heating oil. This is not an exhaustive list of fuel dealers; other dealers likely exist in the state, but they were unresponsive to our phone calls.

With the exception of one large commercial bioheat account that began in 2001, fuel dealers generally began selling biodiesel between 2004 to 2007.

The majority of fuel dealers sell biodiesel both for heating fuel and transportation, though some specialize in just one or the other. Two current dealers interviewed did not provide volume information. The six biodiesel dealers who provided volume data for transportation fuel sold 151,350 gallons of B100<sup>e</sup> in 2009. The four dealers who provided volume information for heating fuel in 2009 sold a total of 110,925 gallons of B100<sup>e</sup>.

Fuel dealer customers include residential users, commercial users, farms, oil dealers, educational institutions, and municipal agencies. High customer demand was the main motivation for dealers to offer biodiesel. Their customers were largely motivated to purchase biodiesel due to environmental issues, but also expressed concern about the higher price. Several dealers mentioned that customers need to be educated about biodiesel and think more customer education would lead to higher sales.

Current dealers did not cite service-related issues, except one mention of a biological contamination issue at one customer's filling depot. Several dealers mentioned that their customers are either sticking with a low bio-blend (B5 and below) to avoid any potential warranty issues or they are aware that they are taking their own risk in this regard. One respondent said, "We get good feedback on a 5% blend. We started with a 20% blend but when engine manufacturers went to a 5% guarantee, that's what we went with."

### **Former Biodiesel Dealers**

Seven survey respondents formerly sold biodiesel but no longer sell it due to a variety of reasons. Three dealers stopped selling it in 2006, two in 2007 and two in 2010. There were four common reasons they stopped selling biodiesel: infrastructure issues, supply issues, low customer demand, and the loss of the tax credit.

What would it take for these dealers to get back into the biodiesel business?

- Reliable winter blend without freezing/gelling issues.
- Competitive price with #2.
- Reasonable product storage options.
- Higher consumer demand.

Similarly, the three survey respondents who have never sold biodiesel and are not considering selling it in the future cited storage and pricing concerns.

### **Wish Lists**

Past and present fuel dealers were asked for additional comments about biodiesel. Common themes included the following 'wish list' items:

- Local options for rack/supply ideally in Burlington.
- Lower price to make biodiesel cost-competitive with petrodiesel.
- Better storage/supply with an injector system for blending. According to one dealer, "B100 is a hard product to handle because of blending, injection system fixes that."
- Dedicated product storage.
- Tax credits. Nearly all survey respondents are in favor of continuing tax credits to encourage the market. A current biodiesel dealer said, "I think it's really good. When the tax credit for blenders was retracted, that really changed things for us. It made it harder to find places to get it."

- Federal and state mandates. Past and present fuel dealers had mixed opinions on whether federal and state mandates would be a good thing. Some cited concerns that state mandates could push buyers to other states, while others said that anything that helped the biodiesel market would be a good thing.

## ***VI. Biodiesel Producers***

### **Methodology**

Two commercial biodiesel producers – one in Vermont and one in New Hampshire – were interviewed in person in December of 2010. Commercial biodiesel producer survey questions are provided in Appendix D. While these questions provided a guideline for the interviews, conversations often ranged to biodiesel-related topics beyond the scope of the survey itself. Both quantitative and qualitative results of the interviews are summarized below.

### **Findings & Analysis**

#### **Biodiesel Production**

Biodiesel producer 1 (BP1) has built a facility that is currently producing approximately 200 gallons per week using used vegetable oil (UVO) sourced primarily from regional food service establishments. BP1 currently has the plant capacity to produce 800 gallons of B100 per day or about 150,000 gallons per year. BP1 projects that it will produce 85,000 gallons in 2011 and 200,000 gallons in 2012 – depending on UVO availability. At the time of the interview, BP1's fuel was "very close" to achieving ASTM standard, which would allow it to be sold as on-road fuel.

The BP1 production facility was self-financed which came with great risk. Also, negotiating Act 250 in developing the facility was very difficult.

At the time of the interview, biodiesel producer 2 (BP2) was just starting to make 6,000- gallon batches of B100 and expected to be in full production by the end of 2010. At full production, BP2 expects to produce approximately 25,000 gallons/month. They had expected to be in full production during the summer 2010 but UVO sourcing and processing posed many issues. BP2 currently has 80,000 gallons of on-site UVO storage.

BP2 has passed all of their ASTM testing (completed at University of Connecticut and University of Keene) and the National Biodiesel Board has accepted the results. However, BP2 was awaiting IRS approval at the time of the interview. Also, a state licensed engineer has certified the plant construction and operations. These steps qualify BP2's fuel for inclusion in the Renewable Identification Number credits (RINs) program required by the Renewable Fuel Standard 2. BP2 indicates that RINs are worth approximately 80-90 cents per gallon of biodiesel.

Testing costs BP2 about \$1,500 per batch so BP2 won't be testing all batches, since this is a major cost factor. One problem BP2 has identified with fuel testing is that small producers have the same testing costs as the big ones, which creates an uneven playing field.

### **Biodiesel Sales**

BP1 is currently selling approximately 200 gallons per week, roughly 10% for on-road transportation and 90% for use in on-farm equipment. Average B100 sales price in December of last year was \$2.65 per gallon. BP1 indicated that the biodiesel tax credit has helped fuel sales.

One large fuel distributor is interested in purchasing ~5,000 gallons per month of B100 from BP2. They've had a hard time finding ASTM 6751 fuel – and the fuel distributor prefers the locally produced aspect of BP2's fuel. Other local and regional fuel distributors and end users have expressed interest in purchasing B100 from BP2. BP2 does not plan to sell small quantities as they only have tanker loading capacity at their facility. BP2's prices had not been set at the time of the interview but their intention was for them to be “competitive with diesel.”

BP2's facility has no fuel blending capacity. An Injection blending system would make a significant difference in the growth of their business. Such a system was estimated to cost \$50,000 - \$100,000. In the long-term, BP2 would also like a dye-blending system so they can sell to the off-road market as well.

### **Feedstock**

BP1 currently uses 100% UVO for its production feedstock. All UVO is provided free to BP1 (except in one case where they pay the provider 10 cents per gallon). BP1 has found that sourcing UVO is labor-intensive, access is difficult, and identifying and securing relationships with UVO providers is time-consuming. Also, BP1 has had competitive difficulties with Baker Commodities, one of the nation's largest providers of rendering and grease removal services. BP1 has attempted to meet with Baker to help establish a collaborative working relationship but has had little success thus far. BP1 believes that UVO sourcing is a significant limiting factor in growing their business and they wonder if political leaders might help to broker relationships with large food service operations, Baker Commodities, or both. BP1 also suggested the concept of an in-state biodiesel trade group that negotiates for UVO handling as a competitor to Baker Commodities.

BP2 currently uses UVO as its exclusive feedstock, which is collected from hundreds of restaurants in the Vermont-New Hampshire region. BP2 pays restaurants 20 cents/gallon for most of its UVO. Some restaurants provide the UVO at no cost. BP2 has had some “strong-arm” interactions with Baker Commodities, which has an unfavorable reputation with many restaurants for their competitive practices.

For UVO collection, BP2 owns three collection trucks with vacuum systems. Collection is very labor-intensive and expensive. Eventually, BP2 would like to be

control of its own feedstocks (rather than using UVO) and is in discussion with farmers about growing oilseeds. BP2 has indicated they would need a phosphorous & refining process and crushing facility to control feedstock process from start to finish and mobile crushing could also be useful.

### **Business Planning and Facility Development**

BP2 has done all of the business planning with owners and staff. The BP2 facility represents a \$2.5 million investment and it “would have been more” if BP2 hadn’t controlled costs by doing most work themselves and purchasing used equipment.

BP2’s general manager set up the plant and was largely self-taught, having come from a background of setting up laboratories. The most useful resource was the National Renewable Energy Laboratory (NREL) reports, though it was clear they the authors had never actually set up a system. BP2 could help them to refine their reports. Going forward, BP2 may build additional facilities, look more closely at algae as a biodiesel feedstock, or establish oilseed crops with a crushing facility. (BP2 has calculated that it would need 30,000 acres of sunflowers to meet the current plant capacity.)

### **Media portrayal**

BP1 has intentionally not sought media coverage. However, there was one favorable story in the community newspaper. BP1 plans to do a public program soon, make announcements, invite politicians, etc.

BP2 was intentionally keeping a low profile until they were in full production. They have had a few positive articles in local and regional newspapers.

### **Overall Vermont Biodiesel Focus Areas**

To build and fortify the Vermont biodiesel industry, BP1 discussed six major areas that should be addressed:

- Legislative/policy action (e.g., fuel blending mandates)
- Distribution systems for feedstocks and fuel
- Feedstock conversion facilities (e.g., seed crushing facilities)
- Cooperative arrangements between oilseed farmers, fuel producers, seed dryers, fuel quality testing, etc. These arrangements might include equipment sharing.
- Training programs for oilheat service technicians, diesel engine technicians, fleet operators, school operators, etc.
- Broad PR campaign/public education related to biodiesel benefits

At the time of the interview, BP2 identified the biodiesel tax credit not being renewed is a serious industry problem. However, BP2’s business plan is based on no fuel incentives since they can’t be counted on to be consistent. BP2 believes that there will soon be a biodiesel supply bottleneck because the large oil companies (e.g., Mobil, Exxon) are required to blend ~5% renewable fuels and many biodiesel producers have gone under in recent years.



BP2 is not an advocate for fuel mandates. The BP2 business model is designed to be successful without mandates or incentives since policies are not dependable. However, BP2 indicated that it would be beneficial for the State of New Hampshire to institute a renewable fuel standard since the Department of Transportation would be a very large customer.

### **Wish Lists**

Both biodiesel producers were asked about their biodiesel-related “wish lists”. Some responses:

BP1:

- Better access/help with UVO and restaurant relationships
- Financing for equipment and buildings
- Training and education for technical users of biodiesel
- Broad PR campaign/public education (e.g. biodiesel public service announcements)
- Financial and political support for developing UVO supply and sourcing
- Central resource for support and technical assistance for biodiesel users
- In-state and affordable testing service
- Cooperative relationships with fuel distributors

BP2:

- Dumpster collection system with collection truck for larger UVO accounts (like Baker Commodities uses). Estimated to be \$150,000.
- Injection fuel blending system (estimated to be \$50,000 - \$100,000)
- Dye blending system for off-road (non taxed) fuel

## **3. Conclusions**

Despite all of its benefits as a renewable, low-emission fuel with strong potential local economic development potential, biodiesel remains an underutilized resource with low market penetration. Vermont biodiesel consumption peaked in 2008 at 5,632,000 gallons and fell in 2009 to 1,885,500 gallons. This represents about 1% of the state’s total distillate fuel consumption in 2008 of 193 million gallons. In addition (but not unrelated), the number of fuel dealers carrying biodiesel fell from 18 in 2008 to eight currently. No matter how you look at it, biodiesel remains a “boutique” fuel - the usage of which is falling despite years of effort to develop and sustain the market. The questions are: Why? And what, if anything, can be done about it?

The fact that fuel availability, technical issues, and convenience of use were cited by users as challenges suggests that this is not just a “demand-side” problem. For their part, fuel dealers that have formerly carried biodiesel cited four main reasons for no longer doing so:

- Infrastructure issues
- Supply issues
- Low customer demand
- Expiration of the federal biodiesel tax incentive in 2009

Infrastructure issues such as storage, pumping, and blending facilities may be addressed through strategic capital investments – if fuel dealers are convinced that customer demand will provide a return on their investment. “Supply issues” may be solved by terminals and blending facilities in closer proximity to the fuel dealers themselves. The federal blender’s tax incentive has been retroactively extended through 2011 but the fact that biodiesel at all but the lowest blends comes at a price premium is a particular challenge for consumers during this protracted global recession. Perhaps most importantly, the fact that biodiesel users cite “fuel availability” as an issue while fuel dealers are concerned about “low customer demand” suggests a chicken-and-egg challenge that would require a more complete market assessment and analysis to find the best solutions.

This study was intentionally limited to the perspective of the four market sector groups and, as noted, key issues related to the Vermont biodiesel market have been identified. However, there are additional market forces, whose combined effects should be considered in a comprehensive market assessment, including:

Federal incentives and credits:

- Federal biodiesel tax incentive
- Renewable Fuels Standard (RFS2)
- Renewable Identification Number credits (RINs)

Vermont non-profit and funding, advocacy, and technical assistance organizations:

- Vermont Sustainable Jobs Fund
- Vermont Fuel Dealers Association
- Renewable Energy Vermont
- Vermont Clean Cities Coalition

National non-profit and funding, advocacy, and technical assistance organizations:

- National Biodiesel Board

In addition to the key market sectors examined in this study, these and other market forces are likely to have far-reaching implications for the future of biodiesel in Vermont.

# Appendices

## I. Commercial Biodiesel End-user Survey Questions

A. Organization name and name of person completing this survey:

**B. Is your organization currently using biodiesel?**

**If yes:**

**What types, including blend levels and *estimated* volumes:**

Transportation:      gallons in 2009 \_\_\_\_\_; blend \_\_\_\_\_  
                                         gallons in 2008 \_\_\_\_\_; blend \_\_\_\_\_  
                                         gallons in 2007 \_\_\_\_\_; blend \_\_\_\_\_

Heating fuel:            gallons in 2009 \_\_\_\_\_; blend \_\_\_\_\_  
                                         gallons in 2008 \_\_\_\_\_; blend \_\_\_\_\_  
                                         gallons in 2007 \_\_\_\_\_; blend \_\_\_\_\_

**What year did you *start* using biodiesel? \_\_\_\_\_**

**Who is your biodiesel supplier? \_\_\_\_\_**

**If you use biodiesel for transportation fuel:**

Where do you purchase it? \_\_\_\_\_

Is there a price differential between biodiesel and petrodiesel?

If yes, what is the average differential? \_\_\_\_\_

**If you use biodiesel for heating fuel:**

Who is your supplier? \_\_\_\_\_

Is there a price differential between biodiesel and #2 fuel oil?

If yes, what is the average differential? \_\_\_\_\_

**What have been your experiences – positive and negative – regarding biodiesel usage**

- Technical or warranty issues
- Price
- Supply reliability
- Environmental benefits
- Portrayal in the media
- Customer feedback
- Fuel quality
- Other (describe):

**If no:**

**Have you used biodiesel in the past?**

**If yes:**

**Over what period (e.g., 2005 – 2008)?:**

**What types, including blend levels and estimated volumes:**

Transportation:      gallons in 20\_      \_\_\_\_\_; blend \_\_\_\_\_  
                                 gallons in 20\_      \_\_\_\_\_; blend \_\_\_\_\_  
                                 gallons in 20\_      \_\_\_\_\_; blend \_\_\_\_\_

Heating fuel:            gallons in 20\_      \_\_\_\_\_; blend \_\_\_\_\_  
                                 gallons in 20\_      \_\_\_\_\_; blend \_\_\_\_\_  
                                 gallons in 20\_      \_\_\_\_\_; blend \_\_\_\_\_

**Please describe the reasons you stopped using biodiesel:**

- Supply reliability
- Infrastructure issues (e.g., storage, delivery, etc.)
- Technical or warranty issues
- Price
- Public perception/media portrayal
- Other (describe):

**What would it take (if anything) for you to use biodiesel again?**

**If no:**

**Are you considering using biodiesel in the future?**

**If yes:**

**What are your motivators** (marketing benefits, environmental benefits, improved mileage, etc.)

**What are your concerns** (e.g., price, supply reliability, infrastructure issues, technical or warranty issues, public perception, etc.)

**If no:**

**Why not?**

***C. Has media reporting affected your decision to use – or not use – biodiesel?***

If yes: what specific messages – positive and negative – from the media have impacted your decision-making?

***D. Are there any additional comments, stories or suggestions you'd like to share?***

***II. Residential Biodiesel End-user Survey Questions***

***A. Town/city of residence of person completing this survey:***

**B. Are you currently using biodiesel?**

**If yes:**

**What types, including blend levels and *estimated* volumes:**

Transportation:      gallons in 2009 \_\_\_\_\_; blend \_\_\_\_\_  
                                 gallons in 2008 \_\_\_\_\_; blend \_\_\_\_\_  
                                 gallons in 2007 \_\_\_\_\_; blend \_\_\_\_\_

Heating fuel:        gallons in 2009 \_\_\_\_\_; blend \_\_\_\_\_  
                                 gallons in 2008 \_\_\_\_\_; blend \_\_\_\_\_  
                                 gallons in 2007 \_\_\_\_\_; blend \_\_\_\_\_

**What year did you *start* using biodiesel? \_\_\_\_\_**

**If you use biodiesel for transportation fuel:**

**Do you make your own biodiesel? \_\_\_\_\_**

**If you buy it, where? \_\_\_\_\_**

**If you buy it, is there a price differential between biodiesel and petrodiesel? If yes, what is the average differential? \_\_\_\_\_**

**If you use biodiesel for heating fuel:**

**Do you make your own biodiesel? \_\_\_\_\_**

**If you buy it, where? \_\_\_\_\_**

**If you buy it, is there a price differential between biodiesel and #2 fuel oil? If yes, what is the average differential? \_\_\_\_\_**

**What have been your experiences – positive and negative – regarding biodiesel usage:**

- Technical or warranty issues
- Price
- Supply reliability
- Environmental benefits
- Portrayal in the media
- Fuel quality
- Other (describe):

**If no:**

**Have you used biodiesel in the past?**

**If yes:**

**Over what period (e.g., 2005 – 2008)?:**

**What types, including blend levels and estimated volumes:**

Transportation:      gallons in 20\_\_ \_\_\_\_\_; blend \_\_\_\_\_  
                                 gallons in 20\_\_ \_\_\_\_\_; blend \_\_\_\_\_

gallons in 20\_ \_\_\_\_\_; blend \_\_\_\_\_

Heating fuel: gallons in 20\_ \_\_\_\_\_; blend \_\_\_\_\_  
 gallons in 20\_ \_\_\_\_\_; blend \_\_\_\_\_  
 gallons in 20\_ \_\_\_\_\_; blend \_\_\_\_\_

**Please describe the reasons you stopped using biodiesel:**

- Supply reliability
- Technical or warranty issues
- Price
- Public perception/media portrayal
- Other (describe):

**What would it take (if anything) for you to use biodiesel again?**

**If no:**

**Are you considering using biodiesel in the future?**

**If yes:**

**What are your motivators** (environmental benefits, price, improved mileage, convenience, etc.)

**What are your concerns** (e.g., price, supply reliability, inconvenience, technical or warranty issues, public perception, etc.)

**If no:**

**Why not?**

***C. Has media reporting affected your decision to use – or not use – biodiesel?***

**If yes: what specific messages – positive and negative – from the media have impacted your decision-making?**

***D. Are there any additional comments, stories or suggestions you’d like to share?***

***III. Fuel Dealer Survey Questions***

***A. Organization name and name of person completing this survey:***

***B. Is your organization currently selling biodiesel?***

**If yes:**

**What types, including blend levels and volumes:**

Transportation: blend(s) \_\_\_\_\_; gallons in 2009 \_\_\_\_\_

Heating fuel: blend(s) \_\_\_\_\_; gallons in 2009 \_\_\_\_\_

**If possible, please list your key customers by name or customer type (e.g., trucking company, university, farm):**

**What are you hearing – both positive and negative – from your customers regarding biodiesel in general and their purchasing decisions specifically (e.g., technical or warranty issues, benefits of domestic fuel production, price, environmental benefits, portrayal in the media, etc.)?**

**Please describe any service-related issues related to biodiesel you've experienced:**

**Do you plan to continue selling biodiesel?**

**If no:**

**Have you sold biodiesel in the past?**

**If yes:**

**What was the last year in which you sold biodiesel? \_\_\_\_\_**

**Please list the reason(s) you stopped selling biodiesel (check all that apply):**

- Low customer demand
- Price
- Supply reliability
- Infrastructure issues (e.g., storage, delivery, etc.)
- Technical or warranty issues
- Tax issues (e.g., loss of federal biodiesel tax credit in 2010)
- Public perception/media portrayal
- Other (describe):

again?

**What would it take (if anything) for you to sell biodiesel**

**If no:**

**Are you considering selling biodiesel in the future?**

**If yes:**

**What are your motivators (e.g., customer demand, environmental quality, higher margins, etc.)**

**What are your concerns** (e.g., customer demand, price, supply instability, infrastructure issues, permitting, technical issues, tax credits, public perception)

**If no:**

**Why not?**

***C. Has media reporting affected your decision to sell – or not sell – biodiesel?***

If yes: what specific messages – positive and negative – from the media have impacted your decision-making?

***D. Have or could federal biofuel policies (e.g., tax credits, potential for mandates) affected your decision to sell – or not sell – biodiesel?***

If yes: what specific policies have impacted your decision-making?

***E. Are there any additional comments, stories or suggestions you'd like to share?***

#### ***IV. Biodiesel Producer Survey Questions***

***A. Organization name and name of person completing this survey:***

***B. Is your organization currently producing biodiesel?***

**What volumes of B100 have you produced in the recent past – and what are you projecting going forward?:**

Gallons in 2008 \_\_\_\_\_

Gallons in 2009 \_\_\_\_\_

Gallons in 2010 \_\_\_\_\_

Gallons in 2011 \_\_\_\_\_ (projected)

Gallons in 2012 \_\_\_\_\_ (projected)

**What feedstocks are you using in your production process (check all that apply)?**

- UVO
- Virgin Oil
- Tallow
- Other (describe):

**If you are able, please describe your feedstock costs (if any):**



**Please describe your experiences/needs/issues sourcing feedstocks** (e.g., supply issues, transportation issues, logistical bottlenecks, technical/warranty issues, etc.):

**Describe you customers by type and approximate percentage of sales (check all that apply):**

- Fuel dealers, \_\_\_\_\_% of sales
- Commercial end-users, \_\_\_\_\_% of sales
- Residential end-users, \_\_\_\_\_% of sales
- Farms, \_\_\_\_\_% of sales
- Other (please describe): \_\_\_\_\_, \_\_\_\_\_% of sales

**What was your *average* fuel sales price in:**

2008 \_\_\_\_\_ (\$ per gallon)  
2009 \_\_\_\_\_ (\$ per gallon)  
2010 \_\_\_\_\_ (\$ per gallon)

**What have been your experiences – positive and negative – regarding biodiesel production and sales** (e.g., market demand, financing, business planning assistance, scale or capacity of your facility, fuel quality/quality control, etc.)?

**What is on your “wish list” of things that would help you produce and sell biodiesel more effectively?**

***C. Has media portrayal of biodiesel/biofuels affected your business?***

If yes: what specific messages – positive and negative – from the media have impacted your business?

***D. Have state and/or federal policies related to biodiesel impacted your business?***

If yes: what specific policies have impacted your decision-making?

What are your recommended state-level policies that would help support and build your business?

***E. Are there any additional comments, stories or suggestions you’d like to share?***